Claims

1. An unwinding device for unwinding reels of web material wound around a central shaft and delivering said web material to a converting line, comprising:

- supports to support at least a reel in an unwinding position;
- at least a peripheral drive mechanism which acts on the cylindrical surface of the reel being unwound and peripherally transmits to said reel a torque to draw it in rotation;

characterized by: at least a center drive mechanism which transmits centrally to said reel an auxiliary torque to draw it in rotation in combination with the torque transmitted by said peripheral drive mechanism; a control system to reciprocally coordinate operation of said peripheral drive mechanism and of said center drive mechanism.

2. Device according to claim 1, characterized in that said control system controls at least an operating parameter of the center drive mechanism as a function of the unwinding conditions.

3. Device according to claim 2, characterized in that said control system controls the speed of the center drive mechanism.

4. Device according to one or more of the preceding claims, characterized in that the speed of said peripheral drive mechanism is controlled so as to maintain a set value of tension of the web material delivered by said reel, a tensioning sensor being associated with said control system.

5. Device according to claim 2, characterized in that said control system controls the torque applied by said center drive mechanism.

6. Device according to claim 5, characterized in that said control system is programmed to maintain the torque applied by said center drive mechanism within a predetermined interval of values or at a predetermined value.

7. Device according to one or more of the claims from 1 to 5, characterized by comprising a detection system to detect, during unwinding, any angular displacement of the outermost web material on the reel in relation

to the central shaft of the reel, the operation of said center drive mechanism being controlled so as to correct said angular displacement.

8. Device according to claim 7, characterized in that said control system acts on the speed of the center drive mechanism to correct said angular displacement.

9. Device according to claim 7 or 8, characterized in that it comprises: a first sensor to detect at least a first reference integral with the central shaft of said reel; and a second sensor to detect at least a second reference applied to the web material of the reel.

10. Device according to claim 9, characterized in that said second sensor is carried by a supporting arm of the peripheral drive mechanism.

11. Device according to one or more of the preceding claims, characterized in that it comprises a sensor to detect the diameter of said reel, associated with said control system.

12. Device according to claim 11, characterized in that said control system is programmed to control the center drive mechanism giving it an angular rotation speed determined as a function of the speed of the peripheral drive mechanism and of the diameter of the reel.

13. Device according to claim 12, characterized in that said control system is programmed to produce a feedback signal on said center drive mechanism, said feedback signal modifying the operation of the center drive mechanism as a function of the unwinding conditions.

14. Device according to claims 7 and 13, characterized in that said feedback signal is a function of said angular displacement.

15. Device according to claims 6 and 13, characterized in that said feedback signal is a function of the value of the torque applied to the reel by said center drive mechanism.

16. Device according to one or more of the preceding claims, characterized in that said peripheral drive mechanism comprises a belt and means which press said belt on the cylindrical external surface of the reel being unwound.

17. Device according to one or more of the preceding claims,

characterized in that said center drive mechanism comprises a shaft equipped with coupling means engageable and disengageable in relation to the central shaft of the reel.

18. Device according to claim 17, characterized in that said coupling means comprise a grooved coupling.

19. Device according to claim 17 or 18, characterized in that said shaft is axially mobile to engage and disengage from the central shaft of the reel.

20. Device according to claim 19, characterized in that said shaft is supported in a sleeve which slides axially inside a tubular element, said tubular element constituting the cylinder of a piston-cylinder actuator, of which said sleeve forms the moving piston.

21. Device according to claim 20, characterized in that a first gear is splined on said shaft, meshing with a second gear the toothing of which has an axial length sufficient to maintain the two gears in contact in any axial position of the shaft.

22. Device according to one or more of the preceding claims, characterized in that it comprises dual central end supports for at least two approximately axially aligned reels, with the center drive mechanisms for one and for the other of said reels being disposed between the supports for the two reels.

23. Device according to one or more of the previous claims, characterized in that said control system is programmed to disconnect one or the other of the peripheral and center drive mechanisms.

24. A method for unwinding a reel of web material and delivering said web material to a converting line, in which a first unwinding torque is applied peripherally to said reel through contact means with the cylindrical surface of the reel; characterized in that a second unwinding torque is applied to the shaft of said reel and said first and said second unwinding torque are reciprocally coordinated.

25. Method according to claim 24, characterized in that: a peripheral drive mechanism is arranged in contact with the cylindrical surface of the reel

and said first unwinding torque is applied through said peripheral drive mechanism; a center drive mechanism is arranged in connection with the shaft of the reel and said second unwinding torque is applied through said center drive mechanism.

26. Method according to claim 25, characterized in that at least an operating parameter of the center drive mechanism is controlled as a function of the unwinding conditions of the reel.

27. Method according to claim 26, characterized in that the rotation speed of said center drive mechanism is controlled.

28. Method according to claim 25 or 26, characterized in that the peripheral drive mechanism is controlled so as to maintain the tension of the web material delivered from said reel at a set value.

29. Method according to one or more of the claims from 25 to 28, characterized in that the second torque, applied to the shaft of the reel by said center drive mechanism, is controlled as a function of the unwinding conditions of the reel.

30. Method according to claim 29, characterized in that the second torque applied to the reel is controlled so as to maintain it within a pre-established interval or a pre-established value.

31. Method according to one or more of the claims from 25 to 28, characterized in that any angular displacement of the outermost web material wound on said reel in relation to the shaft of the reel is detected and the center drive mechanism is controlled as a function of said angular displacement.

32. Method according to claim 31, characterized in that it comprises the phases of:

- detecting during rotation of said reel at least a first reference integral with the center shaft of said reel;
- detecting during rotation of said reel at least a second reference applied to the web material wound on said reel;
- detecting any variation in the angular distance between said first and said second reference and producing a feedback signal as a function of said

variation;

- producing a feedback signal as a function of said variation;
- modifying an operating parameter of said center drive mechanism as a function of said feedback signal.

33. Method according to claim 32, characterized in that said first and said second reference are detected and said variation is determined at each turn of the reel.

34. Method according to claim 32 or 33, characterized in that said first reference is applied to each turn of the web material wound on said reel, the references on each turn being originally aligned along a same angular position.

35. Method according to one or more of the claims from 25 to 34, characterized in that:

- said peripheral drive mechanism is operated at a peripheral speed;
- the diameter of the reel is detected;
- an angular speed is calculated from said peripheral speed and from said diameter;
- the center drive mechanism is driven at said angular speed.

36. Method according to claim 35, characterized in that a feedback signal is produced to control said center drive mechanism, said feedback signal modifying the operating conditions of the center drive mechanism as a function of the unwinding conditions of the reel.

37. Method according to claim 31 and 36, characterized in that said feedback signal is produced as a function of said angular displacement.

38. Method according to claims 30 and 36, characterized in that said feedback signal is produced as a function of the second torque applied to said reel by said center drive mechanism.

39. Method according to one or more of the claims from 24 to 38, characterized in that said first torque is controlled so as to maintain the tension of the web material unwound from said reel substantially constant.